REPORT OF SURVEY CONDUCTED AT

LETTERKENNY ARMY DEPOT
CHAMBERSBURG, PA

JUNE 1997

Best Manufacturing Practices

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BEST MANUFACTURING PRACTICES CENTER OF EXCELLENCE
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Foreword

This report was produced by the Best Manufacturing Practices (BMP) program, a unique industry and government cooperative technology transfer effort that improves the competitiveness of America's industrial base both here and abroad. Our main goal at BMP is to increase the quality, reliability, and maintainability of goods produced by American firms. The primary objective toward this goal is simple: to identify best practices, document them, and then encourage industry and government to share information about them.

The BMP program set out in 1985 to help businesses by identifying, researching, and promoting exceptional manufacturing practices, methods, and procedures in design, test, production, facilities, logistics, and management – all areas which are highlighted in the Department of Defense's 4245-7.M, *Transition from Development to Production* manual. By fostering the sharing of information across industry lines, BMP has become a resource in helping companies identify their weak areas and examine how other companies have improved similar situations. This sharing of ideas allows companies to learn from others' attempts and to avoid costly and time-consuming duplication.

BMP identifies and documents best practices by conducting in-depth, voluntary surveys such as this one at Letterkenny Army Depot conducted during the week of June 23, 1997. Teams of BMP experts work hand-in-hand on-site with the activity to examine existing practices, uncover best practices, and identify areas for even better practices.

The final survey report, which details the findings, is distributed electronically and in hard copy to thousands of representatives from government, industry, and academia throughout the U.S. and Canada – *so the knowledge can be shared.* BMP also distributes this information through several interactive services which include CD-ROMs, BMPnet, and a World Wide Web Home Page located on the Internet at http://www.bmpcoe.org. The actual exchange of detailed data is between companies at their discretion.

Letterkenny Army Depot operates a maintenance and ammunition depot for the receipt, storage, issue, maintenance, and disposal of assigned commodities, and also provides administrative, logistic, and facilities support to tenants and attached organizations. Base Realignment and Closure 93 postured Letterkenny Army Depot as the Department of Defense's specialized missile components and missile support equipment Center of Technical Excellence and the integrated depot-level maintenance facility.

The Best Manufacturing Practices program is committed to strengthening the U.S. industrial base. Survey findings in reports such as this one on Letterkenny Army Depot expand BMP's contribution toward its goal of a stronger, more competitive, globally-minded, and environmentally-conscious America.

I encourage your participation and use of this unique resource.

Ernie Renner
Director, Best Manufacturing Practices

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Section 1

Report Summary

Background

Letterkenny Army Depot (LEAD), located at Chambersburg, Pennsylvania is a depot installation reporting to the U.S. Army Industrial Operations Command at Rock Island, Illinois. LEAD operates a maintenance and ammunition depot for the receipt, storage, issue, maintenance, and disposal of assigned commodities. LEAD also provides administrative, logistic, and facilities support to tenants and attached organizations.

LEAD's ammunition mission occupies 12,000 acres, with more than 2.2 million square feet of floor space, as well as 902 earth-covered igloos, 10 aboveground igloos, and 100 inert storage locations. In addition to the receipt, storage, and issue of ammunition, LEAD has the capability to perform maintenance on munitions components, surveillance on ammunition and guided missiles, and disposal of up to 10,000 lbs. of ammunition per day through demilitarization, burning, or processing through a deactivation furnace.

On December 18, 1941, the Secretary of War directed the acquisition of land in central Pennsylvania for the storage of ammunition and general supplies. This mission later expanded to include the maintenance of combat and transportation vehicles. This maintenance mission has continually expanded to include electronic equipment, radar, and missile systems. Although the general supply mission transferred to the Defense Logistics Agency in 1992, LEAD retains its ammunition storage mission.

Base Realignment and Closure 93 postured LEAD as the Defense Department's specialized missile components and missile support equipment Center of Technical Excellence and the integrated depot-level maintenance facility. LEAD has joined United Defense, Limited Partnership in a model teaming program for the production of the Army's latest M109 Self-Propelled Howitzer—the Paladin.

Base Realignment and Closure 95 transitioned all towed and self-propelled artillery to Anniston Army Depot. The Base Realignment and Closure commission also recommended privatization of tactical missile guidance and control, or transition to Tobyhanna Army Depot.

Tenant activities located at LEAD include Communications and Electronics Command and Missile Command Liaison Offices consisting of the following:

- Defense Contract Management Area Operations
- Defense Distribution Depot-LEAD
- Defense Megacenter Chambersburg
- Defense Printing Service
- Defense Reutilization and Marketing Office
- Defense Logistics Agency System Automation Center
- Test Measurement and Diagnostic Equipment - Region I
- United Defense, Limited Partnership
- U.S. Army Audit Agency
- U.S. Army Health Clinic
- U.S. Army Materiel Command Management Engineering Activity
- Industrial Logistics Systems Center

LEAD serves as the Industrial Operations Command's Center of Technical Excellence for the Homing All the Way Killer (Phase I); Phased Array Tracking to Interception of Target; and Paladin, Avenger, Sparrow, Hellfire, and Hazard Minimization. LEAD is the organic depot for the overhaul, test, repair, and/or modification for Dragon; Tube-launched, Optically Tracked Wire (TOW) Bradley; TOW2; TOW Cobra; Phoenix; Air to Air Stinger; Sidewinder; High Speed Anti Radar Missile; Army Tactical Missile System; Towed Howitzers (M101, M102, M114, M115, M116, M120, M198 families); Self-Propelled Howitzers (M109 and M110 families); and the M578 Recovery Vehicles. The following Tactical Missile systems are transitioning to LEAD: Multiple Launch Rocket System; Shillelagh; Land Combat Support System; Maverick; and Advanced Medium Range Air to Air Missile.

In addition to the typical facilities that provide LEAD the capability to perform depot level maintenance on a wide variety of equipment, LEAD has many specialized facilities associated with its assigned maintenance and ammunition missions:

- Tritium Facility — Licensed by the Nuclear Regulatory Commission, LEAD has a specially designed facility for the repair of self-luminous sources for fire control components.

- Nuclear Biological and Chemical Filter Testing — LEAD provides training, conducts testing, designs nuclear biological and chemical filter components, and performs nondestructive testing and maintenance on nuclear biological and chemical filter systems.
- Radiographic Inspection Facility —This facility houses a 320-Kilovolt x-ray machine and a 25-Megavolt betatron x-ray machine which provide LEAD with the capability to x-ray through up to 20 inches of steel.
- Firing Range — LEAD's firing range can accommodate everything from small arms to howitzers, tanks, and antitank missiles.
- Flexible Computer Integrated Manufacturing, Computer Numerical Control/Manual Data Interface, and Computer Aided Design/ Computer Aided Manufacturing — Automation, business practices, and equipment are integrated to focus on support of customers.

LEAD has a support agreement with the Air Force to store, test, and ship Shrike, Sparrow, Sidewinder, and High Speed Anti Radar Missiles, and to uproud Sparrow and Sidewinder missiles.

LEAD employs nearly 2,000 civilian personnel, three military personnel, and 497 contractor personnel. The depot includes 19,243 acres and 1,780 buildings with 8.4 million square feet of floor space. LEAD's annual operating budget is $220 million, with an annual payroll of $66 million and local procurement totaling $9.6 million.

Best Practices

The following best practices were documented at Letterkenny Army Depot:

Item Page

manpower, and overtime requirements. Action items are assigned, and any discrepancies are identified and reconciled. These meetings assure proper coordination throughout the Directorate of Ammunition Operations.

Paladin Teaming Contract 10

LEAD entered into a partnership with United Defense, Limited Partnership for the product improvement application on the Paladin M109A2/A3 self-propelled howitzer. The partnership yielded cost avoidances and savings in excess of $61 million, and received national acclaim as a model for government and industry cooperation.

Five-Year Indefinite Quantity Contract Radio Controlled Fire Alarm System 10

LEAD entered into a five-year, indefinite quantity contract for radio controlled fire alarm boxes, panels, and accessories. The unique capability of the contract is that it allows other federal installations to order from the same contract. Items are shipped to the ordering installation; all prices and terms are established in advance; and all coordination for the transfer of funds from other activities, as well as assuming responsibility for proper receipt of the items, are handled through the current contract.

LEAD Recycling Program 11

The LEAD recycling program utilizes excess buildings and equipment and generates $360 thousand in annual cost avoidances. The program recycles old corrugated cardboard; number 1 and number 2 plastics; aluminum and steel cans; and scrap wood and wooden pallets. The program is expected to generate $500 thousand in profits for 1997.

Shop Stores Contract 11

The Shop Stores Contract is a firm fixed price, indefinite quantity contract. Orders are placed to one contractor for an entire project's material. This contract significantly improves work scheduling.

Information

The following information items were documented at Letterkenny Army Depot:

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Avenger Coolant Reservoir Assembly Disconnect Coupling 13

LEAD repairs leaking Avenger reservoir assembly disconnect couplings rather than replacing them. The cost of a new coupling is $422. The cost to repair the coupling is $0.16 for two O-rings and one hour of labor. The first year's savings is nearly $55 thousand.

AIM-9M Sidewinder Missile Umbilical Cable Repair 13

LEAD developed a procedure to duplicate the factory manufacturing process to repair or replace damaged Sidewinder Missile Umbilical Cable boots. When compared to entire cable replacement, this procedure resulted in an average cost savings of $1,046 per cable.

Powder Coating of Support Equipment Components 14

LEAD is using powder coating of small and medium sized parts such as brackets, frames, boxes, and panel fronts. This process is an alternative to the epoxy painting system. The use of the powder coatings reduced curing times, hazardous materials use, and emissions.

Repair of PATRIOT Radar Set Coolant Pump 14

LEAD developed a procedure to repair the PATRIOT Radar Set coolant pump motor shaft bearing and seal surfaces. The procedure utilizes Tungston Inert Gas welding and electrode position plating to build pump shaft diameters for final machining to required dimensions. Cost savings are expected to be $10,600 per coolant pump assembly.

Upround Sidewinder and HARM Missiles 14

LEAD performs testing, uprounding, disassembly, reassembly, inspection, and demilitarization of AIM-9 Sidewinder, HARM, and the Air to Ground Missile-88.

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Section 2

Best Practices

Test

Nondestructive Testing Program

In July 1995, LEAD invested $24 thousand to have its Nondestructive Testing (NDT) Program Manager certified for Level III NDT for Radiographic, Magnetic Particle, and Penetrant through the American Society of Nondestructive Testing (ASNT). An analysis of the cost savings showed that a payback to LEAD for this expenditure occurred every two and one-half months by providing in-house NDT procedure approval and training. This has saved money and simplified the NDT process in lieu of consultation with an off-depot Level III.

The repair activities at LEAD rely on the NDT Lab for important daily piece-part verification. LEAD did not have a certified Level III on-site; the NDT program relied on the Army Research Lab (ARL) at Watertown, Massachusetts for NDT training, procedure preparation, and approval. When the ARL was closed and moved to Aberdeen Test Center, Aberdeen, Maryland, only one Level III was available for training. This change and distance from Aberdeen Test Center caused LEAD to either develop and certify a Level III, or contract with an outside agency.

LEAD selected the NDT Program Manager to train and take the ASNT Level III certification examinations in Radiographic, Magnetic Particle, and Penetrant Testing. Total estimated cost for training and certification examinations was $24 thousand and required more than six months of dedicated study on the Program Manager's part. Listed below are a few of the many benefits of this decision:

- Converted the conventional Radiographic requirement to real time x-ray for the Paladin travel lock, reducing testing time from 14.2 to four hours per Paladin.
- Coordinated the elimination of x-ray requirements on the Paladin gun mount projections where Magnetic Particle and Radiographic testing had been performed. LEAD's Level III convinced Paladin Program Management that weld integrity could be ensured by Magnetic Particle alone. This change reduced eight hours of verification time per Paladin.
- Changed the method of inspection from Penetrant to Magnetic Particle on the M198 Towed Howitzer cradle to reduce man-hours from twenty to two per M198 Howitzer. This practice also reduced hazardous materials normally involved in stripping paint and repainting.

In FY97, 51 new NDT procedures were developed and another 50 are under review. Process changes are underway which include increasing the sensitivity level of the Post Emulsified Penetrant Immersion system from two to three. A new penetrant is being used that is biodegradable, making it more environmentally friendly.

Several test methods involve high amperage flow to detect metal fatigue. LEAD's testing has identified individual cases where the testing was designed by formula which was not as thorough as it could have been. The situations identified could not have been discovered without actually performing the test on a piece-by-piece basis. The resulting NDT has the ability to prevent catastrophic failures in the field.

LEAD has trained and certified base personnel on equipment they are familiar with eliminating the need to travel to distant training sites. Currently LEAD has certified 17 Level IIs for Penetrant; 16 Level IIs for Magnetic Particle; seven Level IIs and one Level I for Radiographic; and three Level Is for Ultrasonic.

Radiological Counting Program

LEAD routinely handles many types of radiological materials while conducting Depot operations. Many of these materials are in the optical and guidance systems of the vehicles and missiles processed by the Depot. In order to comply with safety and Nuclear Regulatory Commission regulations, a 100% survey of all commodities containing radioisotopes in receiving, shipping, or storage is required. To accomplish these surveys, the Depot maintains a dedicated radiological counting facility (RCF).

The counting facility has been in operation about seven years. Prior to that, the program was poorly focused and ineffective due to outdated and unreliable equipment to conduct the required analysis surveys. The equipment in use at that time had

limited sample capacity, required manual data reduction, and had lengthy calibration times. There were no adequate systems or processes for survey tracking and traceability. Slow turnaround times for survey results often delayed operations. The counting facility and its highly temperature-sensitive counting equipment were located in a warehouse with inadequate environmental controls. The impetus for change occurred when mishandling of radiological material resulted in a major Tritium contamination of the industrial radiological facility which required more than $1 million and 18 months to clean up.

This accident highlighted the need for state-of-the-art instrumentation; modern data and record keeping systems; improved quality control; improved environmental and hazardous material controls; effective training programs; and assignment of dedicated personnel. A mobile trailer was purchased which provided adequate space for new laboratory instruments. The trailer had temperature and humidity controls, was self-contained, and could be easily moved if necessary. New equipment included two advanced liquid scintillation counters and a low alpha/beta proportional counter. These instruments provided the capability for high sample capacities, accurate measurements, and interface with personal computer systems for data capture and analysis. A full-time physical science technician was assigned to manage the RCF and serve as the assistant Radiation Protection Officer. All survey activities are logged and assigned tracking numbers for traceability. A suite of software tools is used for data reduction, analysis, and charting.

The new facility and equipment provide a state-of-the-art capability that has reduced analysis time, increased survey efficiency, and provided effective radiological controls. The net results show more efficient and timely operations without delays due to survey backups; improved safety; and the amount of radiological hazardous waste has been reduced by 98% by switching to a biodegradable scintillation solution.

In the coming year, the RCF will be one of the first of nine Army depots to be connected to the Laboratory Information Management System. The pilot program for this system is coordinated out of Wright Patterson Air Force Base. The system will provide an electronic connection allowing the labs to share data with other depots, and track information and samples transiting between depots.

Real Time Radiography Applied to Paladin Production

In 1993, as part of the Paladin howitzer upgrade program, LEAD became responsible for the hull modifications necessary to convert inducted M109 A2/A3 vehicles to the M109 A6 Paladin configuration. The upgrade included an x-ray requirement for the travel lock bracket assembly, which is welded onto the front of the hull.

At the beginning of the program, with a lower production rate of eight vehicles per month, the welded hulls were loaded on a truck; transported several miles to the conventional x-ray facility; unloaded and mounted on a transport fixture; and moved into position in the facility. This process was time and labor consuming and involved a good deal of logistical coordination. The radiographic testing required loading film, and exposing and processing 20 shots at the welded area with two technicians spending a total of 14 man-hours. A failure indication required returning the hull to the welding facility for repair and then repeating the x-ray process.

A new real time radiographic facility (Figure 2-1) was built and has been operational for the last two years. Having this new facility has improved the

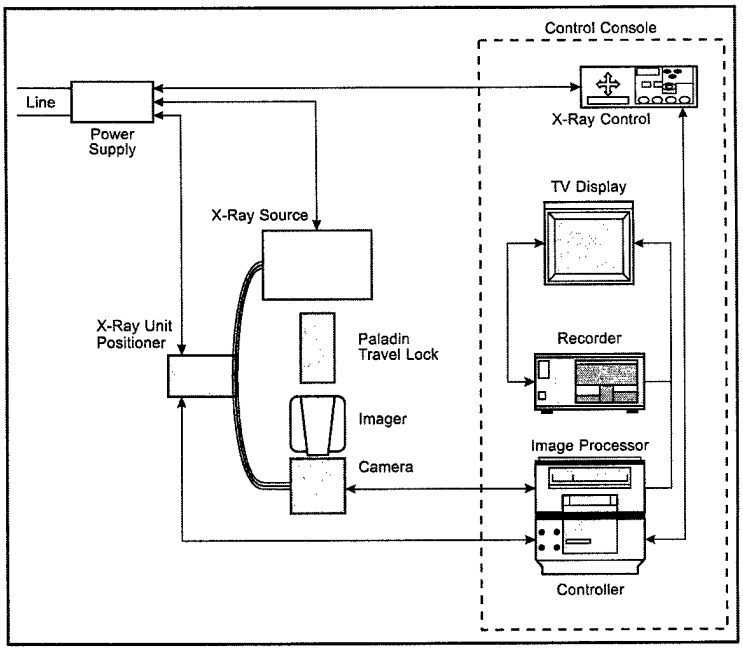

Figure 2-1. Real Time Radiographic Facility

efficiency of this process and prepared LEAD for the requirements of full-scale production of 18 hulls per month. The facility consists of a 160KV source, image intensifier, camera, and console/TV display. The source can be positioned and aimed remotely for all 20 shots from the control panel. Viewing and interpretation is real time through the TV display in the control room with no need for film processing.

With this new system, the hull is inspected in the manufacturing building with transport only requiring a shop cart and forklift. The x-ray image is viewed on a high resolution screen, and records are stored on Super VHS tape. The real time radiography system includes the ability to computer enhance the image to improve the view of any indications. The original 14 man-hours required for the x-ray technicians has been reduced to four man-hours. The transport and logistics costs (truck, trailer, driver, loading, and unloading) have been virtually eliminated. Hazardous material generation has been reduced by the real time viewing which eliminated the need for film and film processing supplies. A printout of any indication can also be made and sent to the weld shop along with any hull requiring repair. Value Engineering savings for implementing this real time system was placed at approximately $663 thousand over a three-year period.

Production

Ingersoll Machining Center

From August 1991 through September 1994, LEAD had a maximum production rate of modifying eight M109 hulls per month. In February 1992, a shop capability study indicated that, in order to achieve full rate production of 18 hulls per month by August 1996, shop capabilities would have to be increased significantly. The practices used at that time to produce one hull incorporated the use of portable machining operations requiring 115 man-hours, and the use of a conventional machining center requiring 72 additional man-hours. Any down-time of the machining center had a direct impact on the schedule and number of hulls produced. In order to solve this problem and improve the capabilities of the shop, a specification was developed in February 1992 for a Computer Numerical Control bridge mill.

The bridge mill would be capable of machining the hulls with a minimal amount of man-hours required for portable and conventional machining. Procurement for the new machine was initiated, but research by LEAD personnel and the Paladin project manager revealed that normal time frame for a machine of this type to come on-line was at least one year. With a mandatory date of August 1996 to achieve full production, LEAD formed a multi-functional integrated process team of 16 members. The members represented all departments involved in the procurement, operation, and installation of the new machine. Meeting once a week, the team had the authority to make any decisions necessary to prevent delays. This effort resulted in the machine being delivered and installed in November 1995, and the first production hull cut being taken in March 1996. The average time frame of one year for on-line startup was reduced by six months. The production rate of 18 hulls per month was exceeded in May 1996, three months ahead of the August schedule.

Benefits of this new machining center include an increase in the present and future capabilities of LEAD; a significant reduction in the machining processes and setups associated with the modification of the M109 hull; a reduction of manual operations performed using conventional and portable tooling; consistent improved quality; and a savings of 79.8 machining man-hours per hull.

Repair of PATRIOT Radar Set Bearing

Phased Array Tracking to Interception of Target (PATRIOT) Radar Bearing assemblies are received from field units in various states of unserviceablilty depending on environmental conditions, use, etc. The bearing assemblies require remanufacture to ensure stability when aligning the PATRIOT missile radar guidance system.

The bearing assemblies are disassembled and the inner and outer races, balls, and spacers are cleaned. The diameter of the removed balls is measured per specifications. Past practice consisted of replacing the bearing assemblies if the inner and outer bearing race diametral difference exceeded 0.025 inch. The cost to the government was $25 thousand per unit. The new method is to only replace the balls using the following formula to determine the diameter of the new balls (5 times the diameter of the present ball bearing plus the present inside diameter measured using the present balls minus the present outside diameter measured using the present balls minus 0.015 inch) divided by three.

By measuring the balls and the clearance within the races, new balls can be made that ensure the required fit. The cost of materials and labor to replace the balls is approximately $2 thousand. When old bearings were used, alignment times would take up to 24 hours; with the new diameter balls, the realignment procedure takes only three hours.

Replacing the bearing balls in lieu of the bearing assembly has proven cost effective and efficient, and is unique in the measurement procedure for the new balls.

Management

Fully Burdened Utility Rate

LEAD's Directorate of Public Works (DPW) established a single rate schedule for sale of utility services on all contracts with tenants to recover the cost of providing electric, water, and sewer utilities.

The DPW is responsible for buying and distributing electric, water, and sewer service for the LEAD programs and tenants. DPW provides all capital improvements and maintenance required on the Depot property to deliver these utilities to the user. Prior to 1993, utility rates charged to the user were prepared under guidance contained in Army Regulation 420-41. However, this guidance did not allow adequate provisions to recoup costs. The DPW utilizes the Army Working Capitol Fund; therefore overhead is not a funded expense which resulted in undercharging on utility contracts with tenants and programs.

Using Activity Based Costing analysis, DPW is now recouping the fully burdened cost from the user. Utility billing is based on metered (actual units consumed times prevailing rate) and unmetered (engineering estimates of yearly units consumed times prevailing rates) computation. Rate development for electricity is based on the combined total of the purchased electricity from the power company, the amortized capital improvements over five years, the normal budget amounts for maintenance and repairs, and the pro-rated share of DPW overhead divided by the estimated units of electricity consumed. Water and sewer rates are based on the combined total of the operation cost of pumping stations, the water treatment plant, the waste treatment plant, the normal cost of maintenance and repair, the amortized capital improvements, and the pro-rated share of overhead divided by the total gallons consumed. Sewer usage is based on 75% of water consumed, and water consumption is based on 50 gallons per person per day plus process demands. Through these actual and estimated usages, a single rate is computed yearly for electricity, water, and sewage usage charged to each tenant, program, and activity.

The practice of developing a single burdened utility rate for reimbursement of utility service has been in effect since 1994. The practice has provided competitive and reliable utility service for the continued operations and performance of LEAD and its tenants.

Multi-Trades Contract

LEAD's DPW implemented a Multi-Trades Contract with a single local vendor to assist the Depot in performing recurring and routine maintenance and public works operations. The concept was initiated to enable DPW to be more competitive with the outside labor market and better meet customer needs in terms of quick response, cost, quality, and timeliness for the completion of work.

In the early 1990s, LEAD recognized that national Base Realignment and Closure (BRAC) initiatives would result in manpower reductions and consolidation of core functions throughout the Army industrial community. Within this framework, DPW began developing a regional public works concept. This strategy included realignment of the Directorate to function as a businesslike organization and expand its workload to include performing work for others in the public sector and for private contractors on the installation. The objective was to enable DPW to competitively sell its services to tenant activities located at LEAD and to outside customers within a 150-mile radius of the Depot.

This approach is consistent with government initiatives to refocus on core mission competencies and service requirements to provide more business-like and better managed government operations. Office of Management and Budget Circular No. A-76, "Performance of Commercial Activities," establishes Federal policy for the performance of recurring commercial activities. This policy has been refined in recent years to include guidance and procedures to determine whether recurring commercial activities should be operated under contract with commercial sources, maintained in-house using government facilities and personnel, or operated through inter-service support agreements. Efforts to "reinvent" the way government does business have encouraged options such as privatization, make or buy decisions, adoption of better business management practices, and joint ventures with the private sector.

To implement this approach, LEAD applied for and received authorization to operate as a businesslike organization and was given a provisional unit identification code. The Multi-Trades Contract was primarily established to enable DPW to meet customer requirements at LEAD while expanding its public and private sector workload without hiring additional personnel.

The Multi-Trades Contract is a firm fixed price indefinite quantity service contract awarded to a local vendor (sole source). LEAD uses the contract primarily for cyclic work such as roofing and heating, ventilation, and air conditioning maintenance, and for service orders and small work requests less than $2 thousand in value. Service orders typically involve construction, alteration, or repair (including painting and decorating) of buildings. By using the contractor for small recurring jobs, LEAD reduced the cost of performing this work and allowed the limited DPW workforce to focus on long-term projects and work for other customers.

The categories of trade personnel covered by the Multi-Trades Contract include (note that * denotes most frequently used; labor is priced on an hourly basis by trade): Laborer, Grounds Maintenance; Pipefitter; Carpenter*; Plumber*; Carpet Layer; Sheet Metal Worker*; Electrician*; Welder; General Maintenance Worker; Woodcraft; Locksmith; Fire Alarm Mechanic; Maintenance Trades Helper; Fire Extinguisher Repair; Mason; Millwright; and Heating, Ventilation and Air Conditioning Mechanic*.

Under the contract, the contractor's required response times for specified work priorities are: Emergency: four hours; Urgent: two days; and Routine: 20 days.

The contractor must decide to reject individual job orders or service orders for emergencies within 30 minutes and all others within 24 hours. Working hours are 6:00 a.m. to 10:00 p.m. The contractor may perform work within a 150-mile radius of LEAD. Service orders are small jobs less than 40 hours, limited to $2 thousand in value. Individual job orders are jobs of 40 to 10,000 hours, limited to $1 million in value. The Multi-Trades Contract has been used mostly for service orders and provides guaranteed annual minimum levels. Table 2-1 shows how the Contract has been applied to date.

Table 2-1. Multi-Trades Contract

Contract Year	Guaranteed	Actual
Base Year	$50,000	$178,549
1st Option Year	$75,000	$426,949
2nd Option Year	$100,000	$284,166
3rd Option Year	$125,000	
4th Option Year	$150,000	

The Multi-Trades Contract has been a very effective mechanism, helping LEAD maintain competitive rates and be responsive to customer requirements. The Contract helped retain existing customers and permitted taking on new public and private sector customers in the region. This strategy is a key part of the Depot's efforts to meet the changes created by government facilities' restructuring while addressing the competitive challenges of the future.

Organizational Meetings

The Director of Ammunition Operations (DAO) initiated a structured DAO meeting format to improve organizational communication and effectiveness. The meetings are held biweekly and divided into major mission areas:

- Storage/Stockpile Reliability
- Army Missile Maintenance
- Demilitarization/Conventional Ammunition Maintenance
- Air Force and Navy Missile Maintenance

The meetings are sequential and last approximately 30 to 45 minutes. All key directorate personnel attend the meetings to ensure that proper discussion of the issues is achieved. Agendas are developed prior to each meeting by the DAO staff, and open time is allowed for any topics and concerns that employees may have regarding the four areas.

One key aspect of the meeting format is the use of an impartial facilitator who is charged with conducting the meetings and providing minutes to key Directorate personnel. The facilitator designates the individuals responsible for future action items and tasks in the meeting minutes. The facilitator is a contract employee, not a DAO or Depot employee, which ensures that meetings are conducted in an impartial manner. This format has been in effect for three to four years. The average number of employees attending the meetings is eight to twelve DAO personnel.

Since this format has been used, the Directorate has reaped several key benefits that have improved morale and organizational effectiveness. First and foremost, communication has been greatly enhanced within the Directorate at all levels. The teaming efforts have been improved and all key issues and taskings have been properly coordinated, benefitting both management and employees.

Paladin Teaming Contract

LEAD and United Defense, Limited Partnership (UDLP), Paladin Production Division, have entered into a partnership to upgrade the Paladin M109A6. This is a very unique and aggressive cooperative effort on the part of both LEAD and UDLP.

Prior to the 1990s, two separate industrial bases were needed to maintain and renovate Army assets—an organic base and a private base. Both sectors were noncompatible and had excess capacity. As the Army started to significantly downsize, it was obvious to both sectors that the organizations needed to integrate and partner where possible if they were to survive as manufacturing organizations. Senior Army leadership, as well as LEAD and private sector companies, recognized the need to create an integrated industrial base where private companies team with government organizations to reduce excess capacity and complement each other's manufacturing expertise. The Army funded a producibility evaluation task team to study companies in order to minimize the learning curve and encourage a joint effort with an existing government facility.

- Partnership — A "Best Value" contract was awarded to UDLP, Paladin Production Division, to upgrade the M109A6 Howitzer at LEAD. The partnership was entered into between the Project Manager Paladin, LEAD, and UDLP. The roles and responsibilities were subsequently agreed upon, and a team venture was initiated at LEAD. UDLP entered into a facility use contract. A key part of the partnership agreement was the Paladin Integration Team. This team, through the use of Integrated Definition Modeling, clearly defined the roles, responsibilities, and processes for which each partner would be accountable.
- Teaming — Under the mutual agreement, each party was responsible for distinct facets of the upgrade program. UDLP was responsible for all parts, make or buy; assembly of turrets; integration of turrets with chassis; and final vehicle test, inspection, storage, and shipment. LEAD was responsible for disassembly of incoming assets; refurbishment of the M109A6 chassis; testing of automotive/carrier systems; and final vehicle painting.
- Program Results — By mutually supporting each partner, several significant savings have been achieved. All M109A6 have been delivered two months ahead of schedule to the customer, Project Manager Paladin. Every M109A6 is delivered in unconditional status with no quality issues. Significant administrative changes and costs have been reduced or eliminated. The joint management team has been able to waive 30 Department of Defense/Army regulations, thereby helping the joint venture succeed. The staffs hold joint quality reviews and have joint resolution of manufacturing/management problems. This unique teaming arrangement, through the acquisition strategy, has allowed the Army to reprogram $46 million.

By each side focusing on its respective strengths and committing to teaming, each partner is in a win-win situation.

Five-Year Indefinite Quantity Contract Radio Controlled Fire Alarm System

LEAD has established a contract that provides the ordering of an unlimited quantity of radio controlled fire alarm boxes, panels, and accessories over a five-year period without further military supply system involvement.

A unique feature of this contract permits the systematic implementation of an effective and efficient radio controlled system for modernizing the base operations fire protection system. The system is also capable of extending to the needs of regional government and private sector fire protection. The radio controlled system consists of frequency modulated radio transmitter alarm stations that report emergency alarm messages to a master control receiver station. The receiver station monitors emergency signals. The wireless system eliminates the need for underground cables or telephone lines. By using solar power for primary power and battery for secondary power, the system is independent of outside power sources. The system is vandal resistant, virtually maintenance free, and provides portability at a much lower cost than conventional line terminated systems. Radio controlled systems are especially cost effective and reliability enhancing when strategically locating emergency alarm stations over a large region, such as the LEAD property and Franklin County.

The contract is currently in its second option year. More than 100 radio controlled alarm stations have been ordered and installed throughout the Depot. They are connected to the Fire Department's Vision 21 System for monitoring. In addition to the fire

protection, other emergency alarm stations have been installed throughout the Depot to monitor emergency conditions of lift stations, turbidity levels at the water plant, flame out and pressure of boilers, and security intrusion. The reliability of the system has significantly reduced the number of alarm checks required and eliminated line repairs. The five-year indefinite quantity contract has significantly reduced the cost of contract administration, saved cost per item ordered, and allowed the system to be built with compatible components. A unique capability of this contract allows other federal installations to order an unlimited quantity of radio controlled boxes, panels, and accessories. These items are then shipped directly to the ordering installations. All prices and terms have been negotiated in advance which eliminates duplication of effort. All coordination for handling the transfer of funds from other activities, and the responsibility for proper receipt of the items are handled through the LEAD contract.

LEAD Recycling Program

The LEAD Recycling Program was established and developed to recover scrap from waste streams, prevent pollution, and conserve natural resources. The major objective of this program is to provide full reimbursement of funds generated back to the installation. This program has utilized excess buildings and equipment for a successful, award winning recycling/reuse program generating $360 thousand in annual cost avoidance.

The solid waste at LEAD was land filled as garbage until 1989. An employee at the base identified the need to collect land filled materials in source separated containers and identified a market for these commodities. By utilizing an unused building, converting unused wire baskets into recycling bins, and acquiring excess material handling equipment from the Defense Reutilization and Marketing Office (DRMO), the foundation of an excellent recycling program was established. To ensure that top market prices were received for the recyclables collected, the program leader chose to store collected materials in baled form. A horizontal baler was purchased to be used for old corrugated cardboard, number 1 and 2 plastics, and aluminum and metal cans. Warehouse space was free; therefore storing large quantities of materials before baling was the best utilization of equipment. At the drive-up collection center, small holes were cut in building walls to allow limited access for recyclables while reducing contamination. Training throughout the base was key to keeping large volumes of clean feed stock. Recycling bins were purchased and distributed base-wide. The custodial services were utilized to transport material from offices to each building's collection center. Equipment turned in at DRMO provided a valuable source for material transport vehicles for the recycling center. An excess DRMO tractor trailer allowed LEAD's recycling program to expand off base and provide recycling drop off/collection centers for three towns within Franklin County. These small communities could not support recycling programs on their own. The 808 tons collected annually in these communities support the volume market prices for LEAD's program.

Each year, 700 tons of wood scrap at the base are ground into mulch by a large shredder purchased from sales of recyclables. The shredded material is sold for $3 per ton. A lumber sales project was established for good, reusable lumber which collects approximately $600 weekly. More than 12,000 good, reusable pallets are sold each year for reuse. The price for each pallet ranges from $4 to $5.

This program, which has won recognition from the Governor of Pennsylvania, has turned wasted resources into a 1997 projected profit of approximately $500 thousand. The revenues generated from this successful program have been utilized to purchase recycling equipment, safety trailer and equipment, several pieces of equipment for Depot Welfare and Recreation, a break area building for employees, and a lighted welcome marquee at the Depot entrance that often announces the lumber sales bargains. Additionally, requests for instruction from other bases continue to increase.

Shop Stores Contract

In 1995, LEAD established a Shop Stores Contract with a local vendor to handle the purchase of common material and supplies used by the DPW. Prior to this, material purchases were handled through the Installation Supply Account and the Directorate of Contracting for procurement actions, then shipped to the Defense Logistic Agency (DLA) for distribution. These purchases required formal procurement actions which added time and cost. For example, typical issue/receipt charges by DLA, even for very low cost items, could be as much as $70 per transaction and often amounted to more than the cost of the item.

The Shop Stores Contract is a firm fixed price indefinite quantity service contract awarded to a single vendor who maintains a supply facility within a 15-mile radius of LEAD. The contractor provides supervision, management personnel, equipment, and supplies to operate and maintain the supply facility. The contractor is authorized to purchase, receive, store, handle, and issue all types of materials. Under the contract, the contractor maintains catalogs and price lists for all items carried. This information, and commercial stock numbers, full descriptions, units of issue, consumption data, and cumulative amounts the government has received are also provided to the government electronically using commercially available software. Orders are placed on a daily basis. The government provides a required delivery date, and the contractor has a required time frame within which to accept or reject the order. In most cases, the contractor delivers the materials, but small orders can be picked up by authorized government personnel. Items available under the contract include plumbing supplies; heating and air conditioning parts; electrical supplies; paint and painting supplies; hardware items; and building materials.

The contract was issued for a base year and four option years with a guaranteed purchase amount of $400 thousand per year. In the first year, the actual purchase amount was $851,600; the actual amount for the second year was $428 thousand.

The Shop Stores Contract has streamlined the process for obtaining materials and supplies. As a result, customer service and satisfaction have greatly improved. The shop stores contract eliminated the cumbersome requirements for sole source procurement and substantially reduced the costs of acquiring and handling material. Inventories of materials have been reduced 50%, and deliveries have been nearly 100% on time. The number of full-time buyers has been reduced from nine to one, and layers of management and paperwork have been eliminated.

Section 3

Information

Production

Avenger Coolant Reservoir Assembly Disconnect Coupling

LEAD has the mission to repair/overhaul the Avenger missile system for the U.S. Army and Marine Corps. This system consists of eight Stinger missiles and a launcher mounted on a High Mobility Multipurpose Wheeled Vehicle. Included in this system, is a 2,000 pound pressure bottle servicing four Stinger missiles and connecting with quick disconnect couplings. Many of these couplings were found to be leaking at the time the system was inducted into the Depot overhaul line.

The original program scope of work did not authorize repair of leaking couplings. Instead they were automatically replaced with new ones costing $442 each. A major problem for this program, in addition to the cost, was the lack of available replacement couplings and a long lead time to obtain new parts. This shortage created the necessity to develop an alternative to enable adequate support of the customer's program requirements.

To resolve the problem of coupling shortages, LEAD engineers performed a reverse engineering analysis of the coupling and the leakage problem. As a result, a repair procedure was developed and approved to replace the connector O-rings. This procedure is now performed on all couplings whether or not leakage is evident. The repair cost, including parts and labor, is approximately $60 per coupling (compared to $442 for new couplings). LEAD recently completed the first of a five-year program, repairing about 100 couplings per month (Avenger Systems and spares), and realizing a savings of $55 thousand.

The process of reverse engineering to compensate for parts shortages and develop cost-effective alternatives has proven to be very effective for LEAD and the Avenger Item Managers. A repair procedure is developed, submitted to the customer for approval, and implemented as a cost savings. The original scope of the maintenance program has changed allowing reuse of parts previously discarded. This type of effort is further documented and credited through the Army Value Engineering program.

AIM-9M Sidewinder Missile Umbilical Cable Repair

As part of the Aerial Intercept Missile (AIM)-9M Sidewinder Missile Depot Operation, the umbilical cable (Figure 3-1) is tested, inspected, and repaired. The past practice consisted of inspecting the cable for serviceability and testing for a 0.1 ohm maximum resistance from point-to-point. If the cable jacket was damaged or if it failed the electrical test, the cable was scrapped. The cost of each replacement cable was $1,230.

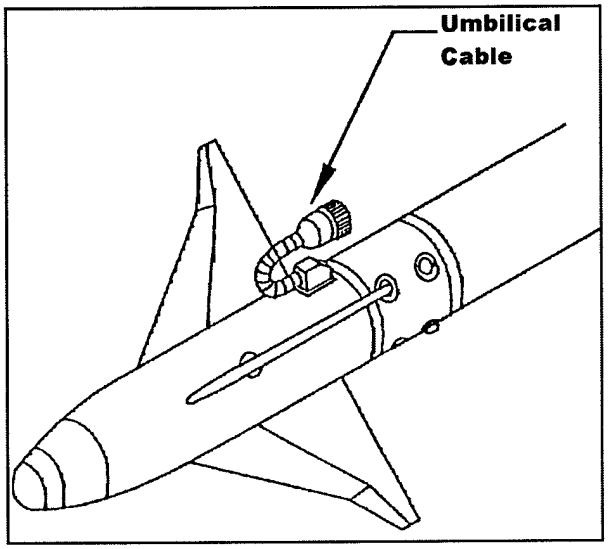

Figure 3-1. AIM-9M Guided Missile

The new procedure developed by LEAD includes the replacement of the cable boot or repair of the boot/connector joints. Electrical test failures are still treated as non-repairable. If the boot is serviceable, but the epoxy boot/connector joints are damaged, the original epoxy and foreign material are removed, and the areas are cleaned, primed, and re-epoxied. If the boot is unserviceable, it is split lengthwise and removed. The original epoxy and foreign material are removed, and the mating surfaces cleaned. The new boot is shrunk into place, and epoxy is then applied to the boot/connector interface. The average cost to repair each cable is $185 versus the $1,230 cost of replacement cables.

Powder Coating of Support Equipment Components

LEAD has the ability to powder coat small and medium sized parts with simple shapes (such as brackets, frames, boxes, and panel fronts) which are later assembled into equipment racks and control panels. The process is listed as an alternative to the liquid epoxy painting system used extensively within the Department of Army.

The use of powder coating improves the quality and finish of the item while extending service life. The current liquid coatings force the use of solvents and primers which increase hazardous emissions and waste of the liquid application. Table 3-1 shows the significant difference in the costs associated with liquid versus powder applications.

Table 3-1. Operating Cost Comparison: Powder versus Liquid Epoxy Paints

	Material			Labor @			
	Topcoat	Primer	Solvent	$22/hr	Energy	Waste	Total
Liquid	$100	$12	$6	$176	$280	$13	$587
Powder	$169	none	none	$132	$56	none	$357

Additionally, the powder not attached to the item can be recovered from the filters and reintroduced into the application media. Cure times are substantially reduced with powder versus liquid application, and powder coatings have no vapor off-gassing issues.

For years, the use of powder coatings has been a proven performer in numerous applications. Once customer approval for this process is secured, it will enhance LEAD's ability to provide a significantly improved product.

Repair of PATRIOT Radar Set Coolant Pump

In an effort to reduce costs and improve turnaround time to the customer, LEAD developed a repair procedure to facilitate the repair of the coolant pump motor/impeller rotor shaft used on the PATRIOT Radar Set coolant pump assembly. Prior to adopting this procedure, repairs to this unit were limited to the replacement of seals, packing, and motor bearings. Any damage or wear to the motor rotor shaft required the entire motor assembly be scrapped and replaced at a cost of just over $11 thousand, since the rotor shaft was not an individual replacement component.

Through the use of reverse engineering of the coolant pump rotor shaft, a repair procedure was developed by LEAD. This procedure incorporates the use of Tungston Inert Gas welding and/or selective copper plating of the worn or damaged areas of the shaft once these areas are pre-machined. After welding and/or plating (depending on the extent of wear or damage) the repaired areas of the shaft are remachined to required specifications. The rotor shaft is then reassembled into the coolant pump assembly, and the assembled unit is tested to ensure proper operation.

By applying this repair procedure, LEAD reduced the cost of the repairs to the coolant pump assembly from just over $11 thousand to an average of $500 per unit. LEAD also expanded the repairs of this unit to include the rewinding of the pump motor when required.

Upround Sidewinder and HARM Missiles

For many years, LEAD had the mission and capability to test, disassemble, upgrade, handle class V explosives, reassemble, package and ship missile systems for the military services. The capability to uproud (or put in a ready-to-fire configuration), store components, assemble and test in one location are essential for the effectiveness of modification programs such as the Sidewinder AIM-9M, High Speed Anti Radar Missiles (HARMs), and Air to Ground Missiles (AGM) 88C.

The Sidewinder is a supersonic, air launched, guided missile employing passive infrared target detection. The missile is 113 inches long, 5 inches in diameter, and is composed of five major components: guidance control; target detector; safety arming device; warhead; and rocket motor. The HARM is a high speed, anti-radar missile capable of detecting, acquiring, displaying, and selecting a transmitting radar threat. HARM is made up of four sections: guidance; control; warhead; and rocket motor.

For the past 30 years, LEAD has been the maintenance and upgrade Depot for the Sidewinder missile. The current Air Force program to retrofit missiles to the AIM-9M configuration involves removing the guidance system, upgrading all components to the latest configuration, applying the latest Air Force Time Compliance Technical Orders, testing upgraded guidance assemblies from the prime

contractor, reassembling the missile to an uproud condition and testing. There is also a Navy retrofit program primarily involving an upgrade to the guidance system. The missile is packaged and returned to the customer with a disk containing all component serial numbers, dates, and other relevant data which are compatible with Air Force and Navy software systems.

The missiles are tested with the same test sets used by the customer's facilities. LEAD is processing approximately eight to ten Sidewinders a day, and has completed about 3,000 for the present upgrade program.

The HARM missile is a newer program for the Air Force and Navy, but involves many similar processes, procedures, and capabilities as the Sidewinder Program. The present Air Force program upgrades the missile to the AGM-88C configuration with a new warhead and guidance system. The program includes disassembly, component replacement, assembly, test in the uproud configuration, and collection of component data compatible with customer software. Present volume is four to six missiles per day. Approximately 500 of the 850 missiles scheduled under this program have been modified. In addition, LEAD has performed an x-ray/cold soak operation on selected AGM-88 rocket motors. This involved placing the motor in an environmental chamber, chilling for 24 hours, and then x-raying the motor to detect any minute flaws. This special process was used to verify the acceptability of more than 2,000 rocket motors.

LEAD has many years experience with these kinds of programs, is a stock point for missile components, and has the facilities for handling class V explosives. The basic processes are readily adaptable to specific requirements of missile upgrade programs. LEAD's experience and capability demonstrate effectiveness for testing and assembling missiles to an uproud configuration.

Logistics

Contractor Supplied Materials to Paladin Production Line

Repair parts supplied to the Paladin line require delivery in correct configuration, number, and type so production is not impeded. The former process delivered kits to each mechanic. At times, the kits did not contain all required parts or were nonconforming to specifications.

The prime contractor, United Defense, Limited Partnership (UDLP), established a three-tier system for parts: expensive, unique, or pilferable; brackets and fixtures; and common hardware. UDLP supplies all required parts that are unique to the contractor, and created a 10% reorder point (ROP) on most items. For expensive or pilferable items, the ROP may be only one. The contractor owns all of the "bench stock" material, but the installation is responsible for the physical control of the inventory. Periodic inventories and reviews of usage, loss, and damage keep UDLP informed of supply problems before they impact production. The former method used a kit system that was supplied to each mechanic at his bay. This method took resources to build the kits and deliver them to the site. Mixed results occurred when the kits contained shortages or damaged parts. Under the new method, UDLP is responsible for the correct number of items being on the line at the right time ensuring an unencumbered flow.

The new process has been in place for three years, and after initial resistance, appears to be working well. LEAD continues to supply DLA parts to the line, and UDLP seems to have resolved the support problems of the past.

Toolmaker Positions

Changes to the mission of the Directorate of Ammunition Operations (DAO) have resulted in the reclassification of the position of Production Equipment Mechanic. The original mission required that equipment mechanics provide maintenance and support to the DAO by maintaining the Ammunition Peculiar Equipment (APE) which was being used for local Depot operations at the time. Modifications or alterations to this equipment were not allowed at the local level, and control was provided by a single manager at Industrial Operations Command.

To support this program at LEAD, the machine shop within DAO was staffed with one welder, one tool and die maker, and three production equipment mechanics. Recent changes to LEAD's mission have resulted in changes to the type of munitions being handled by the DAO. Missiles have replaced conventional ammunition, and the need for APE equipment no longer exists. This change resulted in the need to reclassify the position of the Production Equipment Mechanic to more closely describe the type of work now being performed at that level. The position now requires the mechanic to be readily responsive and innovative. The person must be versatile; multi-skilled; and able to design, fabricate, and install unique missile handling tooling and equipment as required for LEAD to perform

its new mission. DAO has recently reclassified two mechanics to the position of toolmaker. These two positions have replaced the original five positions resulting in closer and more direct support to the DAO. The positions significantly reduced reliance on support from other agencies and provided DAO with the necessary resources to perform LEAD's current mission.

Truck Inspection/Demurrage Tracking

LEAD's truck inspection site is used to inspect commercial and government vehicles for safety/security compliance (DD Form 626) before carrying ammunition items, and also acts as a control for door seals, government bills of lading, and local truck control document Form 3717. Demurrage tracking depends on the above processes being completed accurately, and using Form 3717 for carrier and time identification.

Vehicles arriving to haul ammunition or vehicles with explosives for drop off must undergo a complete review. At a minimum, the driver must have a commercial driver's license, and his vehicle must pass the cited 626 inspection which includes physical checks of the lights, tires, engine, trailer, tarpaulins, straps, fire extinguisher, steering tightness, and hydraulic connections between the tractor and trailer. Additional requirements must be met depending on material sensitivity and hazard classification.

In the last two years, detention tracking shows that significant savings have been realized (Figure 3-2) through the use of the local Form 3717. This form tracks commercial driver down time on the installation and avoids frivolous claims of detention charges (nearly $100 per hour) against the Depot. Forcing drivers to schedule their pickups and deliveries has significantly aided LEAD by controlling the commercial carriers.

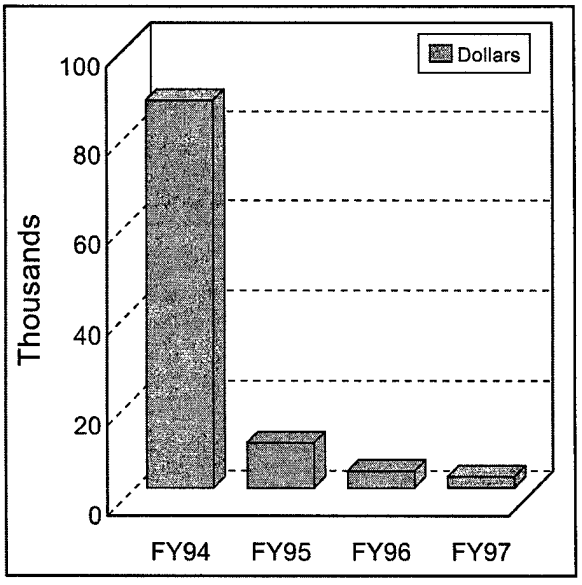

Figure 3-2. Detention Charges

The Depot has managed the programs effectively and is now realizing consistent results. Commercial carriers and the Depot workforce have jointly benefitted from increased safety and productivity.

Management

Ammunition Training/Certification Program Tracking System

All LEAD employees working explosive operations and employees responsible for planning or managing these operations require training. The Ammunition Training/Certification Program Tracking System is a database that tracks the training requirements, certification training history, and upcoming training for personnel in a specific job series.

The Ammunition Training/Certification Program is required training as outlined in the Army Materiel Command (AMC) Regulation 350-4, LEAD Regulation 350-9, and LEAD Circular 15-101. Until four years ago, training was always difficult to track. All certification records were kept manually through a paper system that was labor intensive and conducive to mistakes. It was difficult to keep track of training histories and requirements when personnel were constantly changing positions and job series.

In 1993, a database was developed by LEAD that kept track of personnel training histories and specified requirements by Job Series. The database is relational and is linked to the personnel database that contains employee information such as job series, and Table of Distribution and Allowances line. Required courses per AMC Regulation 350-4 and LEAD Regulation 350-9 are entered into the database. All Form 1556 Training Requests and Form 52 Personnel Actions are entered into this database to indicate required and received training. Searches can be performed to identify the required courses by Job Series, individual, cost center, and Directorate. The database provides a listing of personnel who require a certification course. Data entry and retrieval are easy and accurate.

The database has been operational for the past four years, and has brought accuracy and discipline

to the Ammunition Training/Certification Program tracking requirements. Other training requirements, histories, and schedules can be kept on this database. Plans are to extend this capability to the Hazardous Waste Training program.

Cost Estimating Process

Cost estimating is a process by which costs to perform a specific task or job are determined. The cost estimating process used by DAO at LEAD is based primarily on historical data derived from past jobs in lieu of the application of detailed time standards.

The DAO is responsible for disassembly, detonation, renovation, testing, and salvage of munitions. The majority of customers are Army, Navy, Air Force, and foreign military. Requests for cost estimates are received by telephone and are always followed with a memorandum. The memorandum provides the details of the work requirements such as product identification, description of work, quantities, and schedules. The requests are distributed to the appropriate production controllers for initial development of the cost estimate data and schedules. The production controller coordinates and schedules required meetings to identify, collect, and document man-hours, materials, and other cost data required by the cost center to perform the work.

For the past six years, historical data derived from past jobs was the primary source of data applied to the cost estimating process. Work measurement standards are no longer used because they are out of date, and it was determined they were too costly to develop and apply. Application and maintenance of work measurement standards require a large staff in a normal setting. In today's setting, with the variety of workload requirements experienced by DAO, the accuracy becomes questionable. With the automation of historical data, a variety of scenarios can be compared and estimates can be quickly developed with a high degree of accuracy at a much lower administrative cost than with the use of work measurement standards.

Along with historical data, the applicable organizations provide input. The production controller collects the input and documents these on the Standard Depot System Form 1055-R. This form includes the man-hours, material cost, schedule, and quantities. It is forwarded to the program analysts who apply the appropriate rates to compute the cost per unit and total cost. After the cost estimate is entered into the database for historical records and tracking control, it is forwarded to the appropriate personnel for approval before it is forwarded to the customer.

The cost estimating process based on historical data and organizational input has been a good trade-off in lieu of maintaining the costly work measurement standards. The database tracks the history of cost estimates and the jobs after they are completed, and provides easy access for developing estimates. The cost estimating process is being continuously refined by comparing the actual cost with the estimated cost contained in the historical database.

Requisitions and Turn-Ins

LEAD developed a new way of doing business for requisitions and turn-ins of accountable property. The Director for Supply Management consolidated job functions for document registration and control, and shifted personnel to new positions for central deliveries. The consolidation of job functions eliminated unnecessary delays in processing property documents, and eliminated an estimated one to one-and-one-half days processing time out of a three to five day time line. This represents a 33% decrease in time required to process property documents. All incoming property is now received at one central site for Depot distribution.

LEAD has also aggressively promoted the use of government credit cards at the Depot. This has significantly reduced the amount of administrative time to obtain property, and decreased delivery time of goods to Depot customers. Depot customers are now assured that the property they buy is delivered in a timely fashion and to the proper organization. These initiatives will allow the division to shift additional personnel (approximately 15%) after LEAD completes the current BRAC actions.

Ozone Depleting Solvents

From 1993 to 1996, LEAD greatly reduced the use of ozone depleting chemicals by 87%, primarily 1-1-1 Trichloroethane (TCA), through use of an aggressive solvent substitution program. Aqueous parts washers have replaced a majority of vapor degreasers, and alternative solvents have been used in many cold wash tanks.

The activities at LEAD are very unique, but still need to comply with the Montreal Protocol and the Copenhagen Amendments regarding elimination of ozone depleting solvents in the repair activities at the Base. The major chlorinated solvent used for

surface cleaning was TCA. TCA was used on many programs in several specific applications, not only for its cleaning properties but also for its speed and low cost. TCA was used in hot vapor degreasers and cold dip tanks for metal cleaning, and as an efficient solvent for wipe cloths as well.

When LEAD's environmental team discovered that TCA would not be manufactured after December 1995, they quickly needed to identify alternatives to the 4,100 gallons of TCA used annually. LEAD looked at all cleaning applications throughout the repair activities on Base and discovered that military specifications demanded TCA use for surface cleaning on several programs. Military specification PD 680 allows several alternatives for general cleaning. Alternative cleaning methods were investigated for each program, and the decision was made to purchase 12 aqueous-based power washers at an expense of $640 thousand. The aqueous washers were to be used in all cleaning applications that did not mandate TCA. These soap and hot water cleaners proved to be very sufficient at surface cleaning with no significant production delays. The team also purchased four smaller impulse washers for $11 thousand to handle smaller cleaning tasks.

Although several successful TCA replacements were accomplished, TCA could not be completely replaced on all programs by the end of 1995. To reduce the need to purchase more TCA, a mobile TCA distilling unit was used in February 1995 to reclaim used solvent. Of the 770 gallons of dirty TCA distilled, 743 gallons of clean solvent were returned for reuse. Efforts to identify opportunities to further reduce TCA use throughout operations at LEAD continue. EcoLink has proven to work well for motor cleaning, and Safety Kleen products and Penatone work well for other general cleaning purposes. These safer solvents, while more environmentally friendly, have other benefits such as reduced need for worker personal safety equipment and reduced cost. The waste water from the aqueous washers can go directly to the waste water treatment facility reducing the need for the hazardous waste disposal incurred by old TCA cleaning methods.

Appendix A

Table of Acronyms

Acronym	Definition
AGM	Air to Ground Missile
AIM	Aerial Intercept Missile
AMC	Army Materiel Command
APE	Ammunition Peculiar Equipment
ARL	Army Research Lab
ASNT	American Society of Nondestructive Testing
BRAC	Base Realignment and Closure
DAO	Directorate of Ammunition Operations
DLA	Defense Logistics Agency
DPW	Directorate of Public Works
DRMO	Defense Reutilization and Marketing Office
HARM	High Speed Anti Radar Missile
LEAD	Letterkenny Army Depot
NDT	Nondestructive Testing
PATRIOT	Phased Array Tracking to Interception of Target
RCF	Radiological Counting Facility
ROP	Reorder Point
TCA	Trichloroethane
TOW	Tube-launched, Optically Tracked Wire
UDLP	United Defense, Limited Partnership

Appendix B

BMP Survey Team

Team Member	Activity	Function
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Bob Cale (518) 266-5300	**Watervliet Arsenal** Watervliet, NY	**Team Leader**
Rodney Huff (801) 833-2181	**Tooele Army Depot** Tooele, UT	
Jack Tamargo (707) 642-4267	**BMP Satellite Center Manager** Vallejo, CA	
	Team 2	
Rick Purcell (301) 403-8100	**BMP Center of Excellence** College Park, MD	**Team Leader**
Darrel Brotherson (319) 295-3768	**Rockwell Collins Avionics &** **Communications** Cedar Rapids, IA	
Tim Donnelly (309) 782-3655	**U.S. Army** **Industrial Operations Command** Rock Island, IL	
Larry Halbig (317) 306-3838	**Hughes Air Warfare Center** Indianapolis, IN	

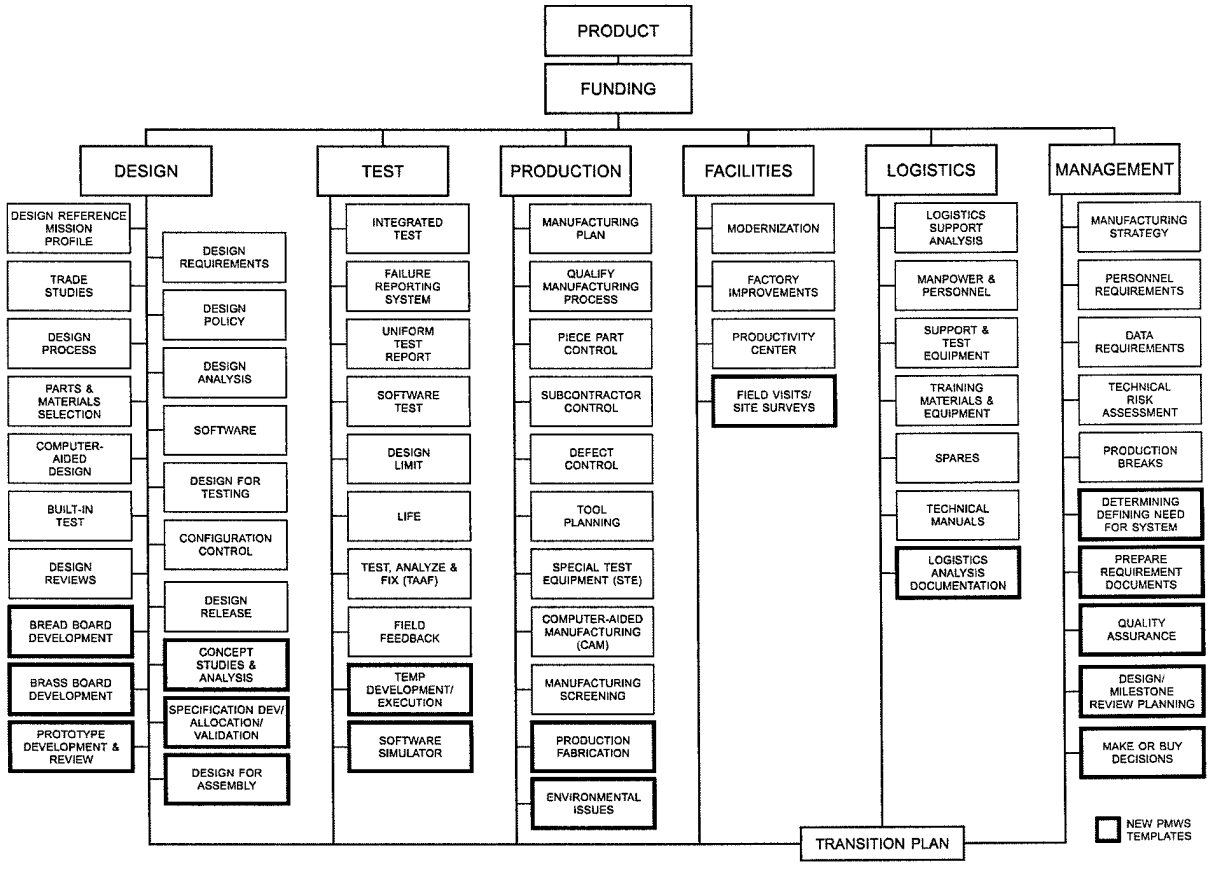
Appendix C

Critical Path Templates and BMP Templates

This survey was structured around and concentrated on the functional areas of design, test, production, facilities, logistics, and management as presented in the Department of Defense 4245.7-M, *Transition from Development to Production* document. This publication defines the proper tools—or templates—that constitute the critical path for a successful material acquisition program. It describes techniques for improving the acquisition process by addressing it as an *industrial* process that focuses on the product's design, test, and production phases which are interrelated and interdependent disciplines.

The BMP program has continued to build on this knowledge base by developing 17 new templates that complement the existing DOD 4245.7-M templates. These BMP templates address new or emerging technologies and processes.

"CRITICAL PATH TEMPLATES FOR TRANSITION FROM DEVELOPMENT TO PRODUCTION"

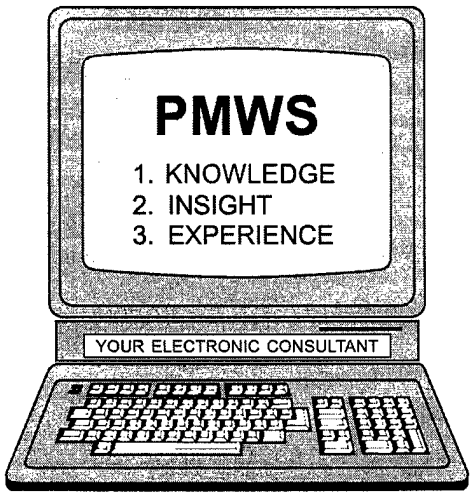


Appendix D

BMPnet and the Program Manager's WorkStation

The BMPnet, located at the Best Manufacturing Practices Center of Excellence (BMPCOE) in College Park, Maryland, supports several communication features. These features include the Program Manager's WorkStation (**PMWS**), electronic mail and file transfer capabilities, as well as access to Special Interest Groups (SIGs) for specific topic information and communication. The BMPnet can be accessed through the World Wide Web (at http://www.bmpcoe.org), through free software that connects directly over the Internet or through a modem. The PMWS software is also available on CD-ROM.

PMWS provides users with timely acquisition and engineering information through a series of interrelated software environments and knowledge-based packages. The main components of PMWS are KnowHow, SpecRite, the Technical Risk Identification and Mitigation System (TRIMS), and the BMP Database.



KnowHow is an intelligent, automated program that provides rapid access to information through an intelligent search capability. Information currently available in KnowHow handbooks includes Acquisition Streamlining, Non-Development Items, Value Engineering, NAVSO P-6071 (Best Practices Manual), MIL-STD-2167/2168 and the DoD 5000 series documents. KnowHow cuts document search time by 95%, providing critical, user-specific information in under three minutes.

SpecRite is a performance specification generator based on expert knowledge from all uniformed services. This program guides acquisition personnel in creating specifications for their requirements, and is structured for the build/approval process. SpecRite's knowledge-based guidance and assistance structure is modular, flexible, and provides output in MIL-STD 961D format in the form of editable WordPerfect® files.

TRIMS, based on DoD 4245.7-M (the transition templates), NAVSO P-6071, and DoD 5000 event-oriented acquisition, helps the user identify and rank a program's high-risk areas. By helping the user conduct a full range of risk assessments throughout the acquisition process, TRIMS highlights areas where corrective action can be initiated before risks develop into problems. It also helps users track key project documentation from concept through production including goals, responsible personnel, and next action dates for future activities.

The **BMP Database** contains proven best practices from industry, government, and the academic communities. These best practices are in the areas of design, test, production, facilities, management, and logistics. Each practice has been observed, verified, and documented by a team of government experts during BMP surveys.

Access to the BMPnet through dial-in or on Internet requires a special modem program. This program can be obtained by calling the BMPnet Help Desk at (301) 403-8179 or it can be downloaded from the World Wide Web at http://www.bmpcoe.org. To receive a user/e-mail account on the BMPnet, send a request to helpdesk@bmpcoe.org.

Appendix E

Best Manufacturing Practices Satellite Centers

There are currently six Best Manufacturing Practices (BMP) satellite centers that provide representation for and awareness of the BMP program to regional industry, government and academic institutions. The centers also promote the use of BMP with regional Manufacturing Technology Centers. Regional manufacturers can take advantage of the BMP satellite centers to help resolve problems, as the centers host informative, one-day regional workshops that focus on specific technical issues.

Center representatives also conduct BMP lectures at regional colleges and universities; maintain lists of experts who are potential survey team members; provide team member training; identify regional experts for inclusion in the BMPnet SIG e-mail; and train regional personnel in the use of BMP resources such as the BMPnet.

The six BMP satellite centers include:

California

Chris Matzke
BMP Satellite Center Manager
Naval Warfare Assessment Division
Code QA-21, P.O. Box 5000
Corona, CA 91718-5000
(909) 273-4992
FAX: (909) 273-4123
cmatzke@bmpcoe.org

Jack Tamargo
BMP Satellite Center Manager
257 Cottonwood Drive
Vallejo, CA 94591
(707) 642-4267
FAX: (707) 642-4267
jtamargo@bmpcoe.org

District of Columbia

Margaret Cahill
BMP Satellite Center Manager
U.S. Department of Commerce
14th Street & Constitution Avenue, NW
Room 3876 BXA
Washington, DC 20230
(202) 482-8226/3795
FAX: (202) 482-5650
mcahill@bxa.doc.gov

Illinois

Thomas Clark
BMP Satellite Center Manager
Rock Valley College
3301 North Mulford Road
Rockford, IL 61114
(815) 654-5515
FAX: (815) 654-4459
adme3tc@rvcux1.rvc.cc.il.us

Pennsylvania

Sherrie Snyder
BMP Satellite Center Manager
MANTEC, Inc.
P.O. Box 5046
York, PA 17405
(717) 843-5054, ext. 225
FAX: (717) 854-0087
snyderss@mantec.org

Tennessee

Tammy Graham
BMP Satellite Center Manager
Lockheed Martin Energy Systems
P.O. Box 2009, Bldg. 9737
M/S 8091
Oak Ridge, TN 37831-8091
(423) 576-5532
FAX: (423) 574-2000
tgraham@bmpcoe.org

Appendix F

Navy Manufacturing Technology Centers of Excellence

The Navy Manufacturing Sciences and Technology Program established the following Centers of Excellence (COEs) to provide focal points for the development and technology transfer of new manufacturing processes and equipment in a cooperative environment with industry, academia, and Navy centers and laboratories. These COEs are consortium-structured for industry, academia, and government involvement in developing and implementing technologies. Each COE has a designated point of contact listed below with the individual COE information.

Best Manufacturing Practices Center of Excellence

The Best Manufacturing Practices Center of Excellence (BMPCOE) provides a national resource to identify and promote exemplary manufacturing and business practices and to disseminate this information to the U.S. Industrial Base. The BMPCOE was established by the Navy's BMP program, Department of Commerce's National Institute of Standards and Technology, and the University of Maryland at College Park, Maryland. The BMPCOE improves the use of existing technology, promotes the introduction of improved technologies, and provides non-competitive means to address common problems, and has become a significant factor in countering foreign competition.

Point of Contact:
Mr. Ernie Renner
Best Manufacturing Practices Center of Excellence
4321 Hartwick Road
Suite 400
College Park, MD 20740
(301) 403-8100
FAX: (301) 403-8180
ernie@bmpcoe.org

Center of Excellence for Composites Manufacturing Technology

The Center of Excellence for Composites Manufacturing Technology (CECMT) provides a national resource for the development and dissemination of composites manufacturing technology to defense contractors and subcontractors. The CECMT is managed by the GreatLakes Composites Consortium and represents a collaborative effort among industry, academia, and government to develop, evaluate, demonstrate, and test composites manufacturing technologies. The technical work is problem-driven to reflect current and future Navy needs in the composites industrial community.

Point of Contact:
Dr. Roger Fountain
Center of Excellence for Composites Manufacturing Technology
103 Trade Zone Drive
Suite 26C
West Columbia, SC 29170
(803) 822-3705
FAX: (803) 822-3730
rfglcc@glcc.org

Electronics Manufacturing Productivity Facility

The Electronics Manufacturing Productivity Facility (EMPF) identifies, develops, and transfers innovative electronics manufacturing processes to domestic firms in support of the manufacture of affordable military systems. The EMPF operates as a consortium comprised of industry, university, and government participants, led by the American Competitiveness Institute under a CRADA with the Navy.

Point of Contact:
Mr. Alan Criswell
Electronics Manufacturing Productivity Facility
Plymouth Executive Campus
Bldg 630, Suite 100
630 West Germantown Pike
Plymouth Meeting, PA 19462
(610) 832-8800
FAX: (610) 832-8810
http://www.engriupui.edu/empf/

National Center for Excellence in Metalworking Technology

The National Center for Excellence in Metalworking Technology (NCEMT) provides a national center for the development, dissemination, and implementation of advanced technologies for metalworking products and processes. The NCEMT, operated by Concurrent Technologies Corporation, helps the Navy and defense contractors improve

manufacturing productivity and part reliability through development, deployment, training, and education for advanced metalworking technologies.

Point of Contact:
Mr. Richard Henry
National Center for Excellence in Metalworking Technology
1450 Scalp Avenue
Johnstown, PA 15904-3374
(814) 269-2532
FAX: (814) 269-2799
henry@ctc.com

Navy Joining Center

The Navy Joining Center (NJC) is operated by the Edison Welding Institute and provides a national resource for the development of materials joining expertise and the deployment of emerging manufacturing technologies to Navy contractors, subcontractors, and other activities. The NJC works with the Navy to determine and evaluate joining technology requirements and conduct technology development and deployment projects to address these issues.

Point of Contact:
Mr. David P. Edmonds
Navy Joining Center
1100 Kinnear Road
Columbus, OH 43212-1161
(614) 487-5825
FAX: (614) 486-9528
dave_edmonds@ewi.org

Energetics Manufacturing Technology Center

The Energetics Manufacturing Technology Center (EMTC) addresses unique manufacturing processes and problems of the energetics industrial base to ensure the availability of affordable, quality energetics. The focus of the EMTC is on process technology with a goal of reducing manufacturing costs while improving product quality and reliability. The COE also maintains a goal of development and implementation of environmentally benign energetics manufacturing processes.

Point of Contact:
Mr. John Brough
Energetics Manufacturing Technology Center
Indian Head Division
Naval Surface Warfare Center
Indian Head, MD 20640-5035
(301) 743-4417
DSN: 354-4417
FAX: (301) 743-4187
mt@command.nosih.sea06.navy.mil

Manufacturing Science and Advanced Materials Processing Institute

The Manufacturing Science and Advanced Materials Processing Institute (MS&AMPI) is comprised of three centers including the National Center for Advanced Drivetrain Technologies (NCADT), The Surface Engineering Manufacturing Technology Center (SEMTC), and the Laser Applications Research Center (LaserARC). These centers are located at The Pennsylvania State University's Applied Research Laboratory. Each center is highlighted below.

Point of Contact for MS&AMPI:
Mr. Henry Watson
Manufacturing Science and Advanced Materials Processing Institute
ARL Penn State
P.O. Box 30
State College, PA 16804-0030
(814) 865-6345
FAX: (814) 863-1183
hew2@psu.edu

- **National Center for Advanced Drivetrain Technologies**
  The NCADT supports DoD by strengthening, revitalizing, and enhancing the technological capabilities of the U.S. gear and transmission industry. It provides a site for neutral testing to verify accuracy and performance of gear and transmission components.

  Point of Contact for NCADT:
  Dr. Suren Rao
  NCADT/Drivetrain Center
  ARL Penn State
  P.O. Box 30
  State College, PA 16804-0030
  (814) 865-3537
  FAX: (814) 863-6185
  http://www.arl.psu.edu/drivetrain_center.html/

- **Surface Engineering Manufacturing Technology Center**

  The SEMTC enables technology development in surface engineering—the systematic and rational modification of material surfaces to provide desirable material characteristics and performance. This can be implemented for complex optical, electrical, chemical, and mechanical functions or products that affect the cost, operation, maintainability, and reliability of weapon systems.

  Point of Contact for SEMTC:
  Dr. Maurice F. Amateau
  SEMTC/Surface Engineering Center
  P.O. Box 30
  State College, PA 16804-0030
  (814) 863-4214
  FAX: (814) 863-0006
  http://www/arl.psu.edu/divisions/arl_org.html

- **Laser Applications Research Center**

  The LaserARC is established to expand the technical capabilities of DOD by providing access to high-power industrial lasers for advanced material processing applications. LaserARC offers basic and applied research in laser-material interaction, process development, sensor technologies, and corresponding demonstrations of developed applications.

  Point of Contact for LaserARC:
  Mr. Paul Denney
  Laser Center
  ARL Penn State
  P.O. Box 30
  State College, PA 16804-0030
  (814) 865-2934
  FAX: (814) 863-1183
  http://www/arl.psu.edu/divisions/arl_org.html

Gulf Coast Region Maritime Technology Center

The Gulf Coast Region Maritime Technology Center (GCRMTC) is located at the University of New Orleans and will focus primarily on product developments in support of the U.S. shipbuilding industry. A sister site at Lamar University in Orange, Texas will focus on process improvements.

Point of Contact:
Dr. John Crisp
Gulf Coast Region Maritime Technology Center
University of New Orleans
Room N-212
New Orleans, LA 70148
(504) 286-3871
FAX: (504) 286-3898

Appendix G

Completed Surveys

As of this publication, 98 surveys have been conducted and published by BMP at the companies listed below. Copies of older survey reports may be obtained through DTIC or by accessing the BMPnet. Requests for copies of recent survey reports or inquiries regarding the BMPnet may be directed to:

Best Manufacturing Practices Program
4321 Hartwick Rd., Suite 400
College Park, MD 20740
Attn: Mr. Ernie Renner, Director
Telephone: 1-800-789-4267
FAX: (301) 403-8180
ernie@bmpcoe.org

1985	Litton Guidance & Control Systems Division - Woodland Hills, CA
1986	Honeywell, Incorporated Undersea Systems Division - Hopkins, MN (Alliant TechSystems, Inc.) Texas Instruments Defense Systems & Electronics Group - Lewisville, TX General Dynamics Pomona Division - Pomona, CA Harris Corporation Government Support Systems Division - Syosset, NY IBM Corporation Federal Systems Division - Owego, NY Control Data Corporation Government Systems Division - Minneapolis, MN
1987	Hughes Aircraft Company Radar Systems Group - Los Angeles, CA ITT Avionics Division - Clifton, NJ Rockwell International Corporation Collins Defense Communications - Cedar Rapids, IA UNISYS Computer Systems Division - St. Paul, MN (Paramax)
1988	Motorola Government Electronics Group - Scottsdale, AZ General Dynamics Fort Worth Division - Fort Worth, TX Texas Instruments Defense Systems & Electronics Group - Dallas, TX Hughes Aircraft Company Missile Systems Group - Tucson, AZ Bell Helicopter Textron, Inc. - Fort Worth, TX Litton Data Systems Division - Van Nuys, CA GTE C^3 Systems Sector - Needham Heights, MA
1989	McDonnell-Douglas Corporation McDonnell Aircraft Company - St. Louis, MO Northrop Corporation Aircraft Division - Hawthorne, CA Litton Applied Technology Division - San Jose, CA Litton Amecom Division - College Park, MD Standard Industries - LaMirada, CA Engineered Circuit Research, Incorporated - Milpitas, CA Teledyne Industries Incorporated Electronics Division - Newbury Park, CA Lockheed Aeronautical Systems Company - Marietta, GA Lockheed Corporation Missile Systems Division - Sunnyvale, CA Westinghouse Electronic Systems Group - Baltimore, MD General Electric Naval & Drive Turbine Systems - Fitchburg, MA Rockwell International Corporation Autonetics Electronics Systems - Anaheim, CA TRICOR Systems, Incorporated - Elgin, IL
1990	Hughes Aircraft Company Ground Systems Group - Fullerton, CA TRW Military Electronics and Avionics Division - San Diego, CA MechTronics of Arizona, Inc. - Phoenix, AZ Boeing Aerospace & Electronics - Corinth, TX Technology Matrix Consortium - Traverse City, MI Textron Lycoming - Stratford, CT

1991	*Resurvey of Litton Guidance & Control Systems Division* - Woodland Hills, CA
	Norden Systems, Inc. - Norwalk, CT
	Naval Avionics Center - Indianapolis, IN
	United Electric Controls - Watertown, MA
	Kurt Manufacturing Co. - Minneapolis, MN
	MagneTek Defense Systems - Anaheim, CA
	Raytheon Missile Systems Division - Andover, MA
	AT&T Federal Systems Advanced Technologies and AT&T Bell Laboratories - Greensboro, NC and Whippany, NJ
	Resurvey of Texas Instruments Defense Systems & Electronics Group - Lewisville, TX
1992	Tandem Computers - Cupertino, CA
	Charleston Naval Shipyard - Charleston, SC
	Conax Florida Corporation - St. Petersburg, FL
	Texas Instruments Semiconductor Group Military Products - Midland, TX
	Hewlett-Packard Palo Alto Fabrication Center - Palo Alto, CA
	Watervliet U.S. Army Arsenal - Watervliet, NY
	Digital Equipment Company Enclosures Business - Westfield, MA and Maynard, MA
	Computing Devices International - Minneapolis, MN
	(Resurvey of Control Data Corporation Government Systems Division)
	Naval Aviation Depot Naval Air Station - Pensacola, FL
1993	NASA Marshall Space Flight Center - Huntsville, AL
	Naval Aviation Depot Naval Air Station - Jacksonville, FL
	Department of Energy Oak Ridge Facilities (Operated by Martin Marietta Energy Systems, Inc.) - Oak Ridge, TN
	McDonnell Douglas Aerospace - Huntington Beach, CA
	Crane Division Naval Surface Warfare Center - Crane, IN and Louisville, KY
	Philadelphia Naval Shipyard - Philadelphia, PA
	R. J. Reynolds Tobacco Company - Winston-Salem, NC
	Crystal Gateway Marriott Hotel - Arlington, VA
	Hamilton Standard Electronic Manufacturing Facility - Farmington, CT
	Alpha Industries, Inc. - Methuen, MA
1994	Harris Semiconductor - Melbourne, FL
	United Defense, L.P. Ground Systems Division - San Jose, CA
	Naval Undersea Warfare Center Division Keyport - Keyport, WA
	Mason & Hanger - Silas Mason Co., Inc. - Middletown, IA
	Kaiser Electronics - San Jose, CA
	U.S. Army Combat Systems Test Activity - Aberdeen, MD
	Stafford County Public Schools - Stafford County, VA
1995	Sandia National Laboratories - Albuquerque, NM
	Rockwell Defense Electronics Collins Avionics & Communications Division - Cedar Rapids, IA
	(Resurvey of Rockwell International Corporation Collins Defense Communications)
	Lockheed Martin Electronics & Missiles - Orlando, FL
	McDonnell Douglas Aerospace (St. Louis) - St. Louis, MO
	(Resurvey of McDonnell-Douglas Corporation McDonnell Aircraft Company)
	Dayton Parts, Inc. - Harrisburg, PA
	Wainwright Industries - St. Peters, MO
	Lockheed Martin Tactical Aircraft Systems - Fort Worth, TX
	(Resurvey of General Dynamics Fort Worth Division)
	Lockheed Martin Government Electronic Systems - Moorestown, NJ
	Sacramento Manufacturing and Services Division - Sacramento, CA
	JLG Industries, Inc. - McConnellsburg, PA
1996	City of Chattanooga - Chattanooga, TN
	Mason & Hanger Corporation - Pantex Plant - Amarillo, TX
	Nascote Industries, Inc. - Nashville, IL
	Weirton Steel Corporation - Weirton, WV
	NASA Kennedy Space Center - Cape Canaveral, FL
	Department of Energy, Oak Ridge Operations - Oak Ridge, TN

1997	Headquarters, U.S. Army Industrial Operations Command - Rock Island, IL
	SAE International and Performance Review Institute - Warrendale, PA
	Polaroid Corporation - Waltham, MA
	Cincinnati Milacron, Inc. - Cincinnati, OH
	Lawrence Livermore National Laboratory - Livermore, CA
	Sharretts Plating Company, Inc. - Emigsville, PA
	Thermacore, Inc. - Lancaster, PA
	Rock Island Arsenal - Rock Island, IL
	Northrop Grumman Corporation - El Segundo, CA
	(Resurvey of Northrop Corporation Aircraft Division)
	Letterkenny Army Depot - Chambersburg, PA

INTERNET DOCUMENT INFORMATION FORM

A . Report Title: Best Manufacturing Practices: Report of Survey Conducted at LetterKenny Army Depot Chambersburg, PA

B. DATE Report Downloaded From the Internet: 12/12/01

C. Report's Point of Contact: (Name, Organization, Address, Office Symbol, & Ph #): **Best Manufacturing Practices**
Center of Excellence
College Park, MD

D. Currently Applicable Classification Level: Unclassified

E. Distribution Statement A: Approved for Public Release

F. The foregoing information was compiled and provided by:
DTIC-OCA, Initials: __VM__ **Preparation Date 12/12/01**

The foregoing information should exactly correspond to the Title, Report Number, and the Date on the accompanying report document. If there are mismatches, or other questions, contact the above OCA Representative for resolution.